

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-12 (Canceled)

Claim 13 (New): An axis determination apparatus for determining a center axis line of a surface of a circular substrate, comprising

a support mount for supporting said substrate placed on a surface thereof,

a drive mechanism for rotating said support mount in a plane containing the surface of said support mount,

a light-emitting device disposed near a circumferential portion of said support mount, and

a light-receiving device disposed, opposite to said light-emitting device, near said circumferential portion of said support mount,

said light-emitting device emitting a beam of light to said light-receiving device, wherein said light-receiving device is disposed so as to receive said beam of light emitted by said light-emitting device only through a notch provided on a circumferential portion of said substrate when said notch is aligned between said light-emitting device and said light-receiving device, and said light-receiving device does not receive emitted light when said notch is not so aligned,

a lifter including a support member arranged on a circle greater than said support mount in diameter and a projected member projected towards a center of said circle, for supporting said substrate and a circumferential portion of said substrate sitting on said projected member, and a lifting mechanism for hoisting and lowering said lifter near said support mount, wherein an inclined surface sloped towards said projected member is provided on said support member and

said lifter transfers said substrate onto a surface of said support mount when said lifter is lowered below said support mount while supporting said substrate, where the center of said substrate is aligned with the center of the support mount, thereby determining the center of said substrate.

Claim 14 (New): The axis determination apparatus according to claim 13, wherein said substrate is clamped against said support mount via vacuum.

Claim 15 (New): A film-thickness measurement apparatus comprising:
an axis determination apparatus for determining a center axis line of a surface of a circular substrate surface; and
a first measurement apparatus for measuring a thickness of an electrically conductive thin film formed on said substrate surface, said first measurement apparatus determines a measurement position on said substrate surface to measure the thickness of said electrically

conductive thin film at said measurement position in accordance with a determined center axis line,

said axis determination apparatus comprising:

a support mount for supporting said substrate placed on a surface thereof,

a drive mechanism for rotating said support mount in a plane containing said surface of said support mount,

a light-emitting device disposed near a circumferential portion of said support mount, and

a light-receiving device disposed opposite of said light-emitting device, and near said circumferential portion of said support mount,

wherein said light-receiving device is disposed so as to receive a beam of light emitted by said light-emitting device only through a notch provided on a circumferential portion of said substrate when said notch is aligned between said light-emitting device and said light-receiving device, and said light-receiving device does not receive emitted light when said notch is not so aligned.

Claim 16 (New): The film-thickness measurement apparatus according to claim 15, said first measurement apparatus comprises:

a film-thickness sensor comprising a measurement coil,

a power source for generating an eddy current in said electrically conductive thin film, by applying AC voltage to said measurement coil when said substrate is in close proximity to said measurement coil, and

a signal measurement device configured to measure a signal generated in said measurement coil by said eddy current.

Claim 17 (New): The film-thickness measurement apparatus according to claim 16, said film-thickness sensor comprises:

a reference coil connected in series to said measurement coil and arranged to stay farther away from said substrate than said measurement coil when said measurement coil faces said substrate, and

two reference resistors connected in series to each other, the serially-connected circuit of said two reference resistors being connected in parallel to the serially-connected circuit of said measurement coil and said reference coil,

wherein said signal measurement device is configured to measure a potential difference between the connection of said measurement coil and said reference coil and the connect of said two reference resistors, as a signal generated in said measurement coil when AC voltage is applied to both ends of the serially-connected circuit of said measurement coil and said reference coil.

Claim 18 (New): A deposition apparatus comprising:

deposition means for depositing a thin film on a circular substrate surface, and a film-thickness measurement apparatus, comprising:

an axis determination apparatus for determining a center axis line of said circular substrate surface, and

a first measurement apparatus for measuring thickness of an electrically conductive thin film formed on said circular substrate surface, said first measurement apparatus determines a measurement position on said circular substrate surface to measure said thickness of said electrically conductive thin film at said measurement position in accordance with said center axis line determined by said axis determination apparatus,

said axis determination apparatus comprising:

a support mount for supporting said substrate placed on a surface thereof,

a drive mechanism for rotating said support mount in a plane containing the surface of said support mount,

a light-emitting device disposed near a circumferential portion of said support mount, and

a light receiving device disposed opposite to said light-emitting device, near the circumferential portion of said support mount,

wherein said light-emitting device is disposed so as to receive a beam of light emitted by said light-emitting device only through a notch provided on a circumferential portion of said

substrate when said notch is aligned between said light-emitting device and said light-receiving device, and said light-receiving device does not receive emitted light when said notch is not aligned.

Claim 19 (New): An axis determination method for determining a center axis line of a circular substrate surface having a notch provided on a circumferential portion of said substrate, comprising the steps of:

first determining a center of said circular substrate surface to provide a determined center;
second determining notch position to provide determined notch position, comprising irradiating said circumferential portion of said substrate with a beam of light emitted from a light-emitting device, while rotating said substrate in a plane containing said substrate surface with said determined center, to interpose the circumferential portion of said substrate between said light-emitting device and a light-receiving device disposed opposite to said light-emitting device, thereby determining said notch position upon said light-receiving device receiving emitted light, and

third determining the center axis line of said circular substrate surface in accordance with said determined notch position and said determined center.

Claim 20 (New): A film-thickness measurement method for measuring a thickness of a film, comprising the steps of:

first determining a center of said circular substrate surface to provide a determined center, said substrate comprising a notch provided on a circumferential portion of said substrate and an electrically conductive thin film deposited on said substrate surface;

second determining notch position to provide a determined notch position, comprising irradiating said circumferential portion of said substrate with a beam of light emitted from a light-emitting device, while rotating said substrate in a plane containing said substrate surface with said determined center to interpose the circumferential portion of said substrate between said light-emitting device and a light-receiving device disposed opposite to said light-emitting device, thereby determining said notch position upon said light-receiving device receiving emitted light,

third determining the center axis line of said substrate surface in accordance with said determined notch position and determined center;

forth determining a measurement position on said substrate surface in accordance with said center axis line; and

measuring the thickness of said electrically conductive thin film at said measurement position.

Claim 21 (New): The film-thickness measurement method according to claim 20, said steps of measuring comprising the steps of:

providing a measurement coil in close proximity to said substrate,

generating an eddy current in said electrically conductive thin film comprising applying AC voltage to said measurement coil; and

detecting a signal produced in said measurement coil by said eddy current, to determine the thickness of said electrically conductive thin film in accordance with said signal.

Claim 22 (New): The film-thickness measurement method according to claim 21, said step of detecting further comprising the steps of:

preparing a Maxwell inductance bridge by connecting a serially-connected circuit of two reference resistors in parallel to a serially-connected circuit of a measurement coil and a reference coil, said serially-connected circuit of two reference resistors having two reference resistors connected in series to each other, said reference coil connected in series to said measurement coil being disposed at a position farther away from said substrate than said measurement coil, and determining a variation in inductance component of said measurement coil and thereby detect a signal produced in said measurement coil by using said Maxwell inductance bridge.

Claim 23 (New): The axis determination apparatus according to claim 13, comprising a plurality of said lifters wherein support members are arranged on a same circle greater than said support mount in diameter respectively and projected members are projected towards a center of said circle in diameter respectively.